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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/758,205	01/16/2004	Hideki Higashitani	2004-0067	4879

513 7590 03/03/2006

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EXAMINER

LAM, CATHY FONG FONG

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/758,205

Applicant(s)

HIGASHITANI, HIDEKI

Examiner

Cathy Lam

Art Unit

1775

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-18 is/are allowed.
- 6) ☒ Claim(s) 19-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 10/420,876.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>11-08-2005</u> . | 6) <input type="checkbox"/> Other: _____ |

In view of the amendment and remarks filed on December 30, 2005, the pending claims are unpatentable as following:

Applicant is required to provide continuation data in the beginning of the specification, since 10/420,876 has been allowed and issued as a patent.

Claim Rejections - 35 USC § 103

1. Claims 19-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andou et al (US 6197407) or Chen et al (US 6346335) or Hayashi (US 6359235) in view of Chen (US 5250363).

Andou teaches a circuit board comprised of an electrical insulating substrate, an adhesive and a wiring transfer layer (Fig. 1(f)).

Adhesive layers (101) are formed over the electrical insulating substrate (102). The adhesive layers are semi-cured thermosetting resin (col 3 L 24-27 & L 34-35). Through holes are formed in the electrical insulating substrate, and conductive paste is filled into the through holes (col 3 L 3-6).

A wiring transfer layer comprised of a supporting base (106) and wiring layers (107) are superposed onto both surfaces of the electrically insulating substrate and over the filled through holes (col 9 L 66-col 10 L 5).

Since the adhesive layers on the insulating substrate are uncured layers, when the wiring transfer layers bring into contact with the adhesive layers, the adhesive layers would conform to any surface roughness (or condition) of the wiring transfer layer. The examiner takes the position that the adhesive layers (101) are part of the electrical insulating substrate (102).

Andou also teaches a multilayer circuit board by stacking a plurality of single circuit board (col 15 L 9-34 & Figs. 4(a) –(e)).

Chen '335 discloses a composite material comprised of a support layer (12), a copper foil (14) and a bond strength enhancing agent (20).

The copper foil (14) is releasably formed onto the support layer (12) and the bonding strength enhancing agent (20) is formed onto the surface of the copper foil that faces away from the support layer (Fig. 1). The bond strength enhancing agent (20) are copper dendrites (col 4 L 49-53).

The composite is bonded to a dielectric substrate (22) which may be a rigid or a flexible layer. An adhesive may be used for bonding between a rigid dielectric substrate and the composite. For a flexible board, the dielectric substrate is an uncured liquid or gel polymer cast onto the composite foil (col 5 L 1-20).

The examiner takes the position that the dielectric substrate has a surface that conforms to the surface of the copper foil (14), or the dielectric surface is complementary to the copper foil surface.

Hayashi discloses a multilayer wiring board having an electronic device (or a component) embedded.

The multilayer wiring board is comprised of a plurality of single wiring boards. The single wiring board is comprised of a semi-cured insulation sheet (1) and a wiring transfer film (5). A wiring pattern (4) is formed onto the wiring transfer film (5). The insulating sheet (1) has through holes (2) formed in the thickness direction and conductive paste (3) is filled into the through holes (2). The wiring transfer film (5) is

brought into contact with the insulating sheet (1) and the wiring pattern is bonded to the surface of the insulating sheet (1) and in electrical contact with the conductive paste (3) (col 5 L 35-38 & L 57-58), Figs. 1A-1E).

The examiner takes the position that the insulating sheet conforms the shape of the wiring pattern of the transfer film, in other words the uncured insulating sheet is complementary to the surface of the wiring transfer film.

A semiconductor device (or a component) is embedded within the multilayer wiring board (Figs. 6A-6E & col 9 L 28-35).

Andou, Chen '335, and Hayashi teach a printed wiring board comprised of a wiring transfer sheet and an insulating substrate. The wiring transfer sheet has a wiring pattern formed on its surface that bring into contact with a semi-cured surface of the insulating substrate.

The examiner takes the position that the insulating substrate has the surface complementary to the surface of the wiring transfer sheet.

The prior art however do not teach the surface of the insulating substrate has a plurality of convexities nor the surface of the transfer sheet has a plurality of concavities.

Chen '363 teaches a printed circuit board comprised of a conductive foil and a dielectric substrate. The conductive foil has a roughened surface that would be bonded to the dielectric substrate (32) (col 1 L 51-53).

In view of the Figures, the dielectric substrate (32) has its bonding surface conforms to the surface roughness of the conductive foil (12) (Fig. 3). The examiner

takes the position that the dielectric substrate has a plurality of convexities and the conductive foil has a plurality of concavities on its bonding surface.

The examiner also takes the position that Andou, Chen '335 and Hayashi all have a surface roughness that conforms to the wiring transfer layer or the wiring support layer. Since applicant has not claimed any surface roughness nor dimensions of the convexities and/or concavities, all the cited prior art *inherently* possess a surface roughness that microscopically has convexities and concavities.

Regarding to the dielectric substrate has convexities occupy 50-98% of the exposed area. The examiner takes the position that convexities and concavities can easily be made by pressing a layer with surface concavities and convexities, respectively, to reach the desired volume %

Allowable Subject Matter

2. Claims 15-18 are allowed.
3. Claim 19 would be allowable if rewritten to incorporate the diameter and/or the height of the convexities limitations.

Response to Arguments

4. Applicant's arguments filed on December 30, 2005 have been fully considered but they are not persuasive. Applicant disagrees the art rejections and raises the following issues:

- A. Chen '363 does not disclose or suggest a wiring board comprising an electrically insulating substrate having an exposed rough surface having a plurality of convexities

nor an exposed wiring layer has the same surface shape as the exposed insulating substrate.

B. Andou, Chen '335 and Hayashi do not teach the surface of the insulating substrate having a plurality of convexities.

In respond to the above issues:

A. Chen is used to show the interface condition between the wiring layer and the insulating substrate, when putting together a roughened wiring layer onto an insulating substrate.

B. Although the prior art are silent about any surface roughness (convexities and/or concavities), it would be *inherent* that all of the cited prior art have *some degree* of *surface roughness* (i.e. convexities and concavities).

In view of the Andou and Hayashi references, they show a wiring transfer sheet bring into contact with an (uncured) insulating substrate, wherein the wiring is pressed into the insulating substrate and flush with the surface of the insulating substrate (Fig. 1(f) & 1(g) of Andou; Fig. 1D & 1E of Hayashi). During this process, the whole surface of the insulating substrate was in contact with the wiring transfer sheet, thus *inherently* the insulating substrate has a surface condition that is complementary to the surface condition to the wiring transfer sheet. Convexities and concavities can easily be formed in this step.

Conclusion


5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (571) 272-1538. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on (571) 272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Cathy Lam
Primary Examiner
Art Unit 1775